

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant : YUI
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For : BRUSH HOLDER...
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Hon. Commissioner of Patents
and Trademarks
Washington, D.C. 20231

APPEAL BRIEF

(1) REAL PARTY IN INTEREST.

The real party in interest is Mabuchi Motor Co., Ltd.

(2) RELATED APPEALS AND INTERFERENCES.

There are believed to be no related appeals or interferences.

(3) STATUS OF CLAIMS.

Claims 1, 3-7 and 14-19 are on appeal.

Claims 2 and 8-13 have been canceled.

Claim 1 stands rejected under 35 U.S.C. 103(a) as being unpatentable over JP S63-

66054 (hereinafter "JP '054"), and further in view of Uchino et al. (JP 11252869 A) and Mabuchi (U.S. 4,574,215).

Claim 3 stands rejected under 35 U.S.C. 103(a) as being unpatentable over JP '054 and Uchino et al. and Mabuchi, and further in view of Yoshida (U.S. 4,238,703).

Claims 4, 6, 14, 18 and 19 stand rejected under 35 U.S.C. 103(a) as being unpatentable over JP '054, and further in view of Uchino et al.

Claims 5 and 7 stand rejected under 35 U.S.C. 103(a) as being unpatentable over JP '054 and Uchino et al., and further in view of Yoshida.

Claims 15-17 have been rejected under 35 U.S.C. 103(a) as being unpatentable over JP '054 and Uchino et al., and further in view of Mabuchi.

(4) STATUS OF AMENDMENTS.

An After Final Amendment has not been filed in response to the final rejection of August 18, 2008. As such, an After Final Amendment has not been entered for purposes of appeal.

(5) SUMMARY OF THE CLAIMED SUBJECT MATTER

CLAIM 1:

The invention is a brush holder device (Figure 1) that is used in a small-size motor. The device provides for a press fit connection of a brush into engagement holes of a holder 2 and a brush arm 1 (page 4, line 26 through page 5, line 2; Figure 1). This advantageously provides a simple and inexpensively manufactured interlocking arrangement that prevents torsion of a

brush-holding portion of the brush arm. The specific interlocking arrangement of the brush arm 1 and the holder 2 provides a brush holding device that has a drastically increased service life. The connection of the brush arm 1 and the holder 2 is significant according to the invention because it also provides for particular heat radiation characteristics that allow for increased heat radiation when compared to conventional arrangements. This advantageously increases the service life of the brush since the brush arm and holder allow for heat to be quickly passed from the brush into the environment, which severely reduces the amount of thermal stress in the brush arm.

The brush holder device (Figure 1) includes the brush arm 1 connected at one end to an input terminal for external electrical connection and supports a brush 7 at an opposite end (page 4, lines 12-15). The brush 7 includes an integrally formed engagement portion (page 4, lines 15-17; page 7, lines 9-12; Figure 2C). The brush holder device includes a brush arm 1 (page 7, lines 12-14; Figure 1; Figure 2B). The brush arm 1 has an engagement hole (page 7, lines 14-19; Figure 2B). The engagement hole has substantially the same shape as that of the engagement portion of the brush 7 (page 7, lines 14-19; Figure 1; Figure 2B). The brush arm 1 includes brush arm brush contact portions 4 located at laterally opposite edges of the engagement hole (page 7, lines 14-19; Figure 1; Figure 2B). The brush holder device also comprises the holder 2 (page 8, lines 5-8; Figure 2A). The holder 2 has an engagement hole (page 8, lines 16-18; Figure 2A) and holder brush contact portions 5 that are formed via bending (page 8, lines 23-27; Figure 2A). The holder 2 is made of a material that has lower spring properties than the brush arm 1 (page 8, lines 8-15; page 9, lines 16-21). The

engagement hole of the holder 2 has substantially the same shape as that of the engagement portion of the brush 7 (page 4, lines 21-24; Figure 1; Figure 2A). The holder 2 is fixed to the brush arm 1 such that the engagement hole of the holder 2 is aligned with the engagement hole of the brush arm 1 (page 4, lines 21-26; Figure 1). The brush arm brush contact portions 4 extend through the engagement hole of the holder 2 (Figure 1). One of the brush arm brush contact portions 4 is adjacent to one of the holder brush contact portions 5 (page 10, lines 1-3; Figure 1). The holder brush contact portions 5 are formed on the holder 2 along opposite edges that define the engagement hole of the holder 2 (page 8, lines 23-27; Figure 2A). One edge of the holder 2 is opposite another edge of the holder 2 in a longitudinal direction of the brush arm 1 (page 8, lines 23-27; Figure 1; Figure 2A; Figure 2B). The engagement portion of the brush 7 is press-fitted into the engagement holes of the holder 2 and the brush arm 1 (page 4, line 26 through page 5, line 2; page 10, lines 5-7). The engagement portion of the brush 7 is fixed to the holder 2 and the brush arm 1 via the holder brush contact portions 5 and the brush arm brush contact portions 4 (page 10, lines 1-7; Figure 1).

CLAIM 3:

The holder 2 may include fins 6, which may be formed through bending along opposite ends of the holder 2 (page 10, lines 7-11; Figure 2A). The ends of the holder may be opposite one another in a longitudinal direction of the brush arm 1 (page 10, lines 7-11; Figure 2A).

CLAIM 4:

Claim 4 is directed toward a brush holder device that includes an arrangement of contact portions 4, 5 of a holder 2 and a brush arm 1 that surround an engagement portion of a brush 7 on all sides. The arrangement of the holder 2 and the brush arm 1 allows for heat to be quickly radiated from the brush 7. This advantageously increases the service life of the brush since the brush is not exposed to high thermal stresses. The contact portions 4 of the brush arm 1 extend through an engagement hole of the holder 2. This interlocking arrangement advantageously prevents the brush arm 1 from receiving torsional forces, which significantly increases the durability and strength of the brush arm 1. This arrangement significantly increases the service life of the brush arm 1.

The brush holder device (page 6, lines 16-20) comprises the brush 7 that includes an integrally formed engagement portion having a first side, a second side, a third side and a fourth side (page 4, lines 15-17; page 7, lines 9-12; page 10, lines 1-3; Figure 2C). The brush holder device further comprises the brush arm 1 that has a defined engagement hole (page 7, lines 14-19; Figure 2B). The engagement hole of the brush arm 1 has substantially the same shape as the shape of the engagement portion of the brush 7 (page 7, lines 14-19; Figure 1; Figure 2B). The brush arm 1 includes a first brush contact portion 4 that is located at one edge that defines the engagement hole of the brush arm and a second brush contact portion 4 that is located at another edge that defines the engagement hole of the brush arm 1 (page 7, lines 14-19; Figure 2B). The first brush contact portion 4 is opposite the second brush contact portion 4 (page 7, lines 14-19; Figure 2B). The first brush contact portion 4 and the second brush contact portion 4 extend in a longitudinal direction of the brush arm 1 (Figure 2B). The brush holder device

also comprises a holder 2 that has a defined brush receiving hole (page 8, lines 16-18; Figure 2A). The brush receiving hole of the holder 2 has substantially the same shape as that of the engagement portion of the brush 7 (page 8, lines 16-18; Figure 1; Figure 2A). The holder 2 includes a third brush contact portion 5 that is located at an edge that defines the brush receiving hole and a fourth brush contact portion that is located at another edge that defines the brush receiving hole (page 8, lines 23-27; Figure 2A). The third brush contact portion 5 is opposite the fourth brush contact portion 5 in a longitudinal direction of the brush arm 1 (Figure 1; Figure 2A; Figure 2B). The holder 2 is connected to the brush arm 1 such that the engagement hole aligns with the brush receiving hole (page 4, lines 21-26; Figure 1) and the first brush contact portion 4 and the second brush contact portion 4 of the brush arm 1 extends through the brush receiving hole of the holder 2 (Figure 1). The engagement portion of the brush 7 extends through the engagement hole of the brush 1 and the brush receiving hole of the holder 2 (page 7, lines 14-19; page 8, lines 16-18; Figure 1) such that the first brush contact portion 4 engages the first side of the brush 7, the second brush contact 4 surface engages the second side of the brush 7, the third brush contact portion 5 engages the third side of the brush 7 and the fourth brush contact portion 5 engages the fourth side of the brush 7 (page 10, lines 1-3; Figure 1). The brush 7 is connected to the holder 2 and the brush arm 1 (page 10, lines 1-3; Figure 1).

CLAIM 5:

The holder 2 may include fins 6 (page 10, lines 7-11; Figure 2A). The fins 6 may be formed through bending along opposite ends of the holder 2 (page 10, lines 7-11). The ends of the holder may be located opposite along a longitudinal direction of the brush arm 1 (page 10, lines 7-11; Figure 1; Figure 2A).

CLAIM 6:

Claim 6 provides for a brush holder device. The brush holder device has a first brush mounting element 1 wherein each contact portion of the first brush mounting element extends through a hole in a second brush mounting element 2 and each contact portion 4 of the first brush mounting element 1 extends along a longitudinal length of the hole of the second brush mounting element 2. This arrangement advantageously provides for a durable and high strength connection of the first brush mounting element and the second brush mounting element, which can be simply and inexpensively manufactured.

The brush holder device (page 6, lines 16-20; Figure 1) comprises a brush 7 that includes an integrally formed engagement portion (page 4, lines 15-17; page 7, lines 9-12; page 10, lines 1-3; Figure 2C). The device further comprises the first brush mounting element 1 that has a defined engagement hole (page 7, lines 14-19; Figure 2B). The engagement hole has substantially the same shape as that of the engagement portion of the brush 7 (page 7, lines 14-19; Figure 1; Figure 2B). The first brush mounting element 1 includes a first brush contact portion 4 that is located at one edge that defines the engagement hole and a second brush contact portion 4 that is located at another edge that defines the engagement hole (page 7, lines

14-19; Figure 2B). The first brush contact portion 4 is located opposite the second brush contact portion 4 (page 7, lines 14-19; Figure 2B). The device also comprises the second brush mounting element 2 that has a defined brush receiving hole (page 8, lines 5-8; page 8, lines 16-18; Figure 2A). The brush receiving hole has substantially the same shape as that of the engagement portion of the brush 7 (page 8, lines 18-23; Figure 1; Figure 2A). The second brush mounting element 2 includes a third brush contact portion 5 that is located at an edge that defines the brush receiving hole and a fourth brush contact portion 5 that is located at another edge that defines the brush receiving hole (page 8, lines 23-27; Figure 2A). The third brush contact portion 5 is opposite the fourth brush contact portion 5 (page 8, lines 23-27; Figure 2A). The third brush contact portion 5 and the fourth brush contact portion 5 define a longitudinal length of the brush receiving hole of the second brush mounting element 2 (page 8, lines 23-27; Figure 2A). The first brush contact portion 4 and the second brush contact portion 4 of the first brush mounting element 1 have a length corresponding to the longitudinal length of the brush receiving hole of the second brush mounting element 2 (Figure 1; Figure 2A; Figure 2B). The first brush mounting element 1 is connected to the second brush mounting element 2 such that the engagement hole is in alignment with the brush receiving hole (page 4, lines 21-26; Figure 1). The first brush contact portion 4 and the second brush contact portion 4 extend through the brush receiving hole (Figure 1). The engagement portion of the brush 7 extends through the engagement hole and the brush receiving hole (page 7, lines 14-19; page 8, lines 16-18; Figure 1) such that the first, second, third and fourth brush contact portions 4, 5 are in direct contact with the engagement portion (page 10, lines 1-3; Figure 1). The brush

7 is connected to the first brush mounting element 1 and the second brush mounting element 2 via the first, second, third and fourth brush contact portions 4, 5.

CLAIM 7:

The second brush mounting element 2 may include fins 6 (page 10, lines 7-11; Figure 2A). The fins 6 may be formed through bending along opposite ends of the second brush mounting element 2 (page 10, lines 7-11; Figure 2A). The ends may be located opposite one another along a longitudinal direction of the first brush mounting element 1 (page 10, lines 7-11; Figure 1; Figure 2A).

CLAIM 14:

The first brush contact portion 4 and the second brush contact portion 4 of the brush arm 1 may have a length that corresponds to a longitudinal length of the brush receiving hole of the holder 2 (Figure 1; Figure 2A).

CLAIM 15:

The holder 2 may be composed of a material having a first modulus of elasticity (page 9, lines 16-21). The brush arm 1 may be composed of another material having a second modulus of elasticity (page 8, lines 8-15). The first modulus of elasticity may be greater than the second modulus of elasticity (page 8, lines 8-15; page 9, lines 16-21).

CLAIM 16:

The holder 2 may be composed of a material having a first modulus of elasticity (page 9, lines 16-21). The brush arm 1 may be composed of another material having a second modulus of elasticity (page 8, lines 8-15). The first modulus of elasticity may be greater than the second modulus of elasticity (page 8, lines 8-15; page 9, lines 16-21).

CLAIM 17:

The first brush mounting element 1 may be composed of a material having a first modulus of elasticity (page 8, lines 8-15). The second brush mounting 2 may be composed of another material having a second modulus of elasticity (page 9, lines 16-21). The second modulus of elasticity may be greater than the first modulus of elasticity (page 8, lines 8-15; page 9, lines 16-21).

CLAIM 18:

The holder 2 may have a thickness that is greater than a thickness of the brush arm 1 (page 9, lines 16-21).

CLAIM 19:

The second brush mounting element 2 may have a thickness that is greater than a thickness of the first brush mounting element 1 (page 9, lines 16-21).

(6) GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL.

Whether claim 1 is rejectable under 35 U.S.C. 103(a) as being unpatentable over JP '054, and further in view of Uchino et al. and Mabuchi.

Whether claim 3 is rejectable under 35 U.S.C. 103(a) as being unpatentable over JP '054 and Uchino et al. and Mabuchi, and further in view of Yoshida.

Whether claims 4, 6, 14, 18 and 19 are rejectable under 35 U.S.C. 103(a) as being unpatentable over JP '054, and further in view of Uchino et al.

Whether claims 5 and 7 are rejectable under 35 U.S.C. 103(a) as being unpatentable over JP '054 and Uchino et al., and further in view of Yoshida.

Whether claims 15-17 are rejectable under 35 U.S.C. 103(a) as being unpatentable over JP '054 and Uchino et al., and further in view of Mabuchi.

(7) ARGUMENT.

ISSUE: Whether claim 1 is rejectable under 35 U.S.C. 103(a) as being unpatentable over JP '054, and further in view of Uchino et al. and Mabuchi.

The present invention relates to a brush holder device that is used in motors. The brush

holder device includes a holder and a brush arm. Both the holder and the brush arm have brush holder contact portions. Each brush contact portion of the brush arm is located at an edge that defines the engagement hole of the brush arm. Each brush contact portion of the holder is located at an edge that defines the engagement hole of the holder. The engagement hole of the holder is aligned with the engagement hole of the brush arm when the holder is connected to the brush arm. The brush contact portions of the brush arm extend through the engagement hole of the holder so that each brush contact portion of the brush arm is next to one of the brush contact portions of the holder when the brush arm is connected to the holder. The brush contact portions of the holder and the brush arm engage the engagement portion of the brush so that the brush is connected to the brush arm and the holder. The interlocking connection of the brush arm to the holder is significant in the present invention because it advantageously enhances the strength, rigidity and durability of the holder. This connection advantageously prevents torsion of a brush-holding portion of the brush arm. This advantageously provides a brush holder device that has a longer service life. Further, the brush contact portions of the brush arm and the holder advantageously provide for better heat radiating characteristics than conventional techniques. The prior art as a whole fails to disclose such features or advantages.

JP '054 discloses a brush arm 1 having an insertion hole 2 and a fixing plate 7 having a hole 8. A brush 13 is inserted into the brush insertion hole 13 of the brush arm 1. The brush 13 is then press-fitted to the fixing plate 7 via brush-pressing portions 9, 10 of the fixing plate 7 and via bent portions 11, 12 of the fixing plate 7 that press up against bent portions 3, 4 of the brush arm 1.

JP '054 fails to teach and fails to suggest the combination of a brush arm having brush arm brush contact portions that engage an engagement portion of a brush. Figure 3 of JP '054 clearly shows that the brush arm 1 does not make any contact with the engagement portion of the brush 13. As such, the brush arm 1 fails to have brush arm brush contact portions as featured in the present invention since the brush arm 1 of JP '054 fails to make any contact with the engagement portion of the brush 13 as claimed. The fact that the brush arm brush contact portions of the brush arm contact the engagement portion of the brush is significant in the present invention because it provides for a stronger and more durable connection of the brush arm to the brush. JP '054 takes a different approach than that of the present invention. Instead of press fitting the brush to the brush arm as featured in the present invention, the brush arm 1 of JP '054 is connected to the brush 13 via bent projections 5 and 6. This disadvantageously provides for a less secure connection when compared to that of the interlocking arrangement of the holder and brush arm of the present invention. As such, the prior art as a whole fails to direct the person of ordinary skill in the art toward important features of the present invention.

JP '054 fails to teach or suggest the combination of holder brush contact portions formed on opposite edges of a holder in a longitudinal direction of a brush arm. As clearly shown in Figure 1 of JP '054, the brush-pressing portions 9, 10 are formed on edges in a direction transverse of the longitudinal direction of the brush arm 1. In contrast to JP '054, one brush contact portion of the holder in the present invention is located opposite another brush contact portion of the holder in a longitudinal direction of the brush arm. This is significant in the present invention because this allows space for the brush contact portions of the brush arm

to pass through the engagement hole of the holder. This advantageously provides rigidity and strength to the holder because when the brush is press-fitted into the engagement holes of the holder and brush arm, the brush contact portions press up against the edges of the holder. This advantageously prevents torsion of the brush arm and enhances the overall durability of the holder, which leads to a longer service life of the brush holder device. JP '054 fails to provide brush-pressing portions 9, 10 that are formed on edges in a longitudinal direction of the brush arm 1. In fact, JP '054 does not teach that brush arm 1 has brush arm brush contacting portions that extend through the insertion hole 8 of the fixing plate 7 as featured in the claimed combination. As such, JP '054 takes a different approach and fails to teach or suggest the features of the present invention.

Uchino et al. discloses a brush holder device 1 having first and second planar pressure pieces 2g, 2h arranged in the direction of revolution of a commutator. The first and second planar pressure pieces 2g, 2h are capable of being brought into planar contact with the brush holder attaching portion of a brush 10. Third and fourth planar pressure pieces 2i, 2j are placed in a direction orthogonal to the direction of the revolution of the commutator. The third and fourth planar pressure pieces 2i, 2j are capable of being brought into planar contact with the brush holder attaching portion 10c of the brush 10. First and second linear pressure pieces 2n, 2p are placed in the direction orthogonal to the direction of revolution of the commutator. The first and second linear pressure pieces 2n, 2p are capable of being brought into linear contact with the brush holder attaching portion 10c of the brush 10.

The Office Action takes the position that it would have been obvious to modify the

holder of JP '054 to include brush contact portions oriented in the longitudinal direction of the brush arm since Uchino et al. shows brush contact portions extending upward on the brush arm. Appellant respectfully disagrees with this interpretation since the prior art references as a whole fail to provide any suggestion of using the teachings of Uchino et al. to modify the structure of JP '054. JP '054 discloses that it is essential that brush-pressing portions 9, 10 of the fixing plate are parallel with bent portions 11, 12 of the fixing plate 7 as well as bent portions 3, 4 of the brush arm 1 since the parallel brush-pressing portions 9, 10 and bent portions 11, 12 of the fixing plate 7 are inserted between the bent portions 3, 4 of the brush arm 1 and side walls of the brush 3 to press-fit the brush against the brush-pressing portions 9, 10 via the resiliency of the fixing plate 7. The brush-pressing portions 9, 10 would not function if the portions 9, 10 were formed along opposite edges in a longitudinal direction of the brush arm 1 as taught by Uchino et al. since the bent portions 3, 4 would not apply any pressure to the portions to press fit the portions to the brush 13. As such, the references as a whole do not direct the person of ordinary skill in the art toward the combination of brush arm contact portions located at laterally opposite edges of an engagement hole as claimed.

Mabuchi fails to teach and fails to suggest the combination of holder brush contact portions that are formed on a holder along opposite edges that define an engagement hole of the holder wherein one edge of the holder is opposite another edge of the holder in a longitudinal direction of the brush arm. Mabuchi merely discloses a terminal strip 9' that forms a brush arm 7' and a commutator contact strip 10' each made of desired conductive metals wherein strip 10' carries a brush 11 for engaging the commutator. However, the brush arm 7'

does not have a holder as claimed. As clearly shown in Figure 5 of Mabuchi, the brush arm 7' merely has two longitudinally extending portions in the area of the brush 11, but there is no holder that has laterally opposite holder brush contact portions that are formed on opposite edges of the holder in a longitudinal direction of the brush arm 7' as featured in the present invention. Compared with Mabuchi, the holder is significant in the present invention because it advantageously reduces the torsional stress that is exerted on the brush arm. This drastically increases the durability and service life of the brush arm. Mabuchi fails to disclose such high strength and durability advantages since Mabuchi is completely void of any mention of a holder having laterally opposite contact portions as claimed. As such, the prior art as a whole fails to establish a prima facie case of obviousness since the references as a whole do not teach, or direct the person of ordinary skill in the art toward the interlocking arrangement of a holder and a brush arm as featured in the present invention.

The prior art does not teach and does not suggest the combination of features claimed. The prior art directs the person of ordinary skill in the art toward structures which are dissimilar to the claimed structure. Each of the references teach in a direction away from the combination claimed. The references do not render the claimed subject matter obvious. Accordingly, it is requested that the rejection be reversed and that claim 1 be indicated to patentably define over the prior art.

ISSUE: Whether claim 3 is rejectable under 35 U.S.C. 103(a) as being unpatentable over JP '054 and Uchino et al. and Mabuchi, and further in view of Yoshida.

Although Yoshida discloses a miniature electric motor wherein the commutator brush is inserted into a brush holding member, the references as a whole fail to suggest the combination of features claimed. Specifically, the references as a whole fail to teach or suggest the combination of a holder brush contact portions that are located on opposite ends in a longitudinal direction of a brush wherein an engagement portion of a brush is press fitted into the engagement holes of the holder and the brush arm. JP '054 teaches that it is critical that the parallel brush pressing portions 9, 10 and bent portions 11, 12 of the fixing plate 7 are inserted between the bent portions 3, 4 of the brush 1 and side walls of the brush 13 so that the brush 13 is press fitted against the brush pressing portions 9, 10. The person of ordinary skill in the art would not look to the teachings of Uchino et al. to provide a holder having laterally opposite brush contact portions since the brush-pressing portions 9, 10 of JP '054 would not function if the portions 9, 10 were formed along opposite edges in a longitudinal direction of the brush arm 1 as taught by Uchino et al. Further, Mabuchi and Yoshida merely disclose a brush arm that engages a brush, but neither reference teaches a holder having fins and brush contact portions that are located in a longitudinal direction of the brush arm, wherein the holder is connected to the brush arm. As such, the references as a whole do not suggest the invention and therefore all claims define over the prior art as a whole.

Accordingly, Applicant respectfully requests that the holding be reversed and that the rejection be removed.

ISSUE: Whether claims 4, 6, 14, 18 and 19 are rejectable under 35 U.S.C. 103(a) as

being unpatentable over JP '054, and further in view of Uchino et al.

CLAIM 4

JP '054 and Uchino et al. fail to provide any teaching or suggestion that would direct the person of ordinary skill in the art toward the combination of brush arm contact portions located at laterally opposite edges of an engagement hole. At most, JP '054 discloses a brush arm 1 having bent portions 3 and 4 that do not contact the engagement portion of the brush 13. Figures 3 and 5 of JP '054 clearly show that a space exists between the engagement portion of the brush 13 and the brush arm 1. The Office Action takes the position that it would have been obvious to have the brush arm brush contact portions extending through the engagement hole of the holder and also to have the holder brush contact portions located on opposite edges in the longitudinal direction since Uchino et al. already discloses brush contact portions on opposite edges in the longitudinal direction. However, the references as a whole fail to provide any teaching or suggestion that would direct the person of ordinary skill in the art or render obvious using the teachings of Uchino et al. to modify the brush holder of JP '054. JP '054 teaches that it is crucial that the brush-pressing 9 and 10 of the fixing plate 7 are parallel with bent portions 11, 12 of the fixing plate 7 as well as bent portions 3, 4 of the brush arm 1 since the parallel brush-pressing portions 9, 10 and bent portions 11, 12 of the fixing plate 7 are inserted between the bent portions 3, 4 of the brush arm 1 and side walls of the brush 13 to press-fit the brush 13 against the brush arm 1 via the resiliency of the fixing plate 7 (page 4, line 27 through page 5, line 10 of English translation). The brush-pressing portions 9, 10 of JP '054

could not properly engage the brush 13 if the portions 9, 10 were formed along opposite edges in a longitudinal direction of the brush arm 1 as claimed. As such, the references as a whole do not direct the person of ordinary skill in the art toward the combination of brush arm contact portions located at laterally opposite edges of the engagement hole as claimed.

CLAIM 6

JP '054 discloses a brush arm 1 having an insertion hole 2 and a fixing plate 7 having a hole 8. A brush 13 is inserted into the brush insertion hole 13 of the brush arm 1. The brush 13 is then press-fitted to the fixing plate 7 via brush-pressing portions 9, 10 of the fixing plate 7 and via bent portions 11, 12 of the fixing plate 7 that press up against bent portions 3, 4 of the brush arm 1.

JP '054 fails to teach and fails to suggest the combination for a first brush mounting element and a second brush mounting element wherein the first brush mounting element has a first brush contact portion and a second brush contact portion that extend through a hole in the second brush mounting element. At most, JP '054 discloses a brush 1 that has bent portions 3, 4. However, the bent portions 3, 4 do not extend through the brush insertion hole of the fixing plate 7 as claimed. Compared with JP '054, the first brush contact portion and the second brush contact portion of the first mounting element extend through a hole in the second mounting element. This interlocking arrangement of the contact portions of the first mounting element within the hole of the second mounting element is significant in the present invention because it greatly decreases the torsional stress exerted on the first brush mounting element. JP '054

fails to disclose such torsional stress reducing advantages since the bent portions 3, 4 of JP '054 do not extend through the brush insertion hole 8 of the fixing plate 7 as claimed. In fact, the bent portions 3, 4 of JP '054 do not have a length that corresponds to a longitudinal length of the brush insertion portion 8 of the fixing plate 7. Figures 1 and 4 of JP '054 clearly show that the bent portions 3, 4 are longer than the longitudinal length of the brush insertion portion 8. As such, JP '054 fails to direct the person of ordinary skill in the art toward each and every feature of the claimed combination.

Uchino et al. discloses a brush holder device 1 having first and second planar pressure pieces 2g, 2h arranged in the direction of revolution of a commutator. The first and second planar pressure pieces 2g, 2h are capable of being brought into planar contact with the brush holder attaching portion of a brush 10. Third and fourth planar pressure pieces 2i, 2j are placed in a direction orthogonal to the direction of the revolution of the commutator. The third and fourth planar pressure pieces 2i, 2j are capable of being brought into planar contact with the brush holder attaching portion 10c of the brush 10. First and second linear pressure pieces 2n, 2p are placed in the direction orthogonal to the direction of revolution of the commutator. The first and second linear pressure pieces 2n, 2p are capable of being brought into linear contact with the brush holder attaching portion 10c of the brush 10.

Uchino et al. fails to provide any teaching or suggestion for the combination of a first brush contact portion and a second brush contact portion that extend through a hole in the second brush mounting element. At most, Uchino et al. discloses a brush holder device 1 having first and second planar pressure pieces 2g, 2h, third and fourth planar pressure pieces

2i, 2j and first and second linear pressure pieces 2n, 2p. However, the third and fourth planar pressure pieces 2i, 2j and the first and second linear pressure pieces 2n, 2p do not extend through a hole in a second brush mounting element as claimed. Uchino et al. only discloses a brush holder device 1 and is completely void of any mention of a second brush mounting as featured in the present invention. Uchino et al. merely discloses that various pieces of the brush holder device 1 engage a brush holder attaching portion 10c of a brush 10, but Uchino et al. provides no suggestion for arranging the brush holder device 1 such that the various pieces extend through a second brush mounting element. Neither Uchino et al. nor JP '054 direct the person of ordinary skill in the art toward contact portions of a brush arm that extend through an opening of a holder. In fact, Uchino et al. does not teach or suggest a first brush contact portion and a second brush contact portion that has a length that corresponds to a longitudinal length of a hole of a second brush mounting element. This feature is significant in the present invention because it allows the first mounting element to interlock with the second mounting element such that the first mounting element is prevented from being exposed to torsional stress. This advantageously leads to a longer service life of the brush holder device. Uchino et al. fails to disclose such a durable brush holder device since Uchino et al. is completely void of a first brush mounting element that interlocks with a second brush mounting element as featured in the claimed combination. As such, the prior art as a whole fails to establish a prima facie case of obviousness since the references as a whole do not teach or suggest the interlocking connection of a first mounting brush element and a second mounting brush element as recited in the claimed combination.

CLAIM 14

The Office Action takes the position that Figure 1 of JP '054 discloses a first brush contact portion and a second brush contact portion of a brush arm that has a length that corresponds to a longitudinal length of a brush receiving hole of a holder. Appellant respectfully disagrees. Figure 1 of JP '054 clearly does not show that bent portion 3 or bent portion 4 has a length corresponding to a longitudinal length of the brush insertion hole of fixing plate 7. Figure 1 of JP '054 clearly displays the bent portions 3, 4 having a length that is significantly greater than the hole 8 of the fixing plate 7. This disadvantageously does not allow the bent portions 3, 4 to fit within the brush insertion hole of the fixing plate 7. In contrast to JP '054, the brush contact portions of the arm of the present invention has a length that corresponds to a longitudinal length of the hole of the holder. This advantageously allows the brush arm to be press fitted with the holder to provide a secure and durable connection. JP '054 and Uchino et al. fail to provide any teaching or suggestion for such an interlocking feature since both references neither teach nor suggest the combination of contact portions of a brush arm that have a length that corresponds to a longitudinal length of a hole of a holder. As such, the prior art as a whole fails to establish a prima facie case of obviousness since the references as a whole do not direct the person of ordinary skill in the art toward essential features of the present invention.

CLAIM 18

The Office Action states that it would have been obvious to form the holder with a

thickness greater than that of the brush arm. Appellant respectfully disagrees. The different thicknesses of the holder and the brush arm address the problem of decreasing high torsional forces that are exerted on brush arms during operation. This problem significantly decreases the service life of the brush holder device. Applicant has solved this problem of high torsional forces by providing a holder that is thicker than a thickness of a brush arm. The thicker holder combined with the interlocking feature of the holder and brush arm advantageously prevents the brush arm from twisting such that torsional forces are minimized on the brush arm. The prior art as a whole fails to solve the problem of preventing torsional forces exerted on a brush arm by providing a thicker holder and a thinner brush arm since the references as a whole fail to make any distinction between the thicknesses of the brush arm or the fixing plate. As such, the prior art as a whole fails to establish a prima facie case of obviousness since the references as a whole do not direct the person of ordinary skill in the art toward each and every feature of the claimed combination.

CLAIM 19

JP '054 fails to provide any teaching or suggestion for a first brush mounting element that has a thickness that is less than a thickness of a second brush mounting element. Figure 1 of JP '054 shows that the fixing plate 7 and the brush arm 1 are substantially equal in thickness. This disadvantageously fails to address the problem of preventing torsional stress that is exerted on a brush arm. Appellant has discovered that a thicker second brush mounting element combined with being interlocked with a first brush mounting element significantly

decreases the amount of stress that the first mounting element receives. This advantageously provides for a longer-lasting and more durable brush holder device. JP '054 fails to disclose such longer service life advantages since JP '054 is completely void of any mention of any thickness of the fixing plate 7 or the brush arm 1. As such, the prior art as a whole fails to direct the person of ordinary skill toward important features of the present invention.

Conclusion

The prior art does not teach and does not suggest the combination of features claimed. The prior art directs the person of ordinary skill in the art toward structures which are dissimilar to the claimed structure. Each of the references teach in a direction away from the combination claimed. The references do not render the claimed subject matter obvious. Accordingly, it is requested that the rejection be reversed and that the claims be indicated to patentably define over the prior art.

ISSUE: Whether claims 5 and 7 are rejectable under 35 U.S.C. 103(a) as being unpatentable over JP '054 and Uchino et al., and further in view of Yoshida.

CLAIM 5

Claim 5 is directed to fins that are located in a longitudinal direction of the brush arm. Yoshida fails to teach or suggest the combination of a holder that has fins as claimed. Yoshida merely disclose a brush arm that engages a brush. However, the references as a whole provide

absolutely no suggestion for using the teachings of Yoshida to modify the brush holder devices of Uchino et al. and JP '054. Yoshida merely discloses a brush arm having contact portions that engage a brush, but Yoshida fails to provide any suggestion for a holder having fins and brush contact portions that are located in a longitudinal direction of the brush arm as claimed. As such, the prior art as a whole fails to direct the person of ordinary skill in the art toward each feature of the claimed combination.

CLAIM 7

Yoshida fails to provide any teaching or suggestion for the combination of a second brush mounting element that has fins that are located in a longitudinal direction of a first brush mounting element. Yoshida merely discloses brush contact portions of a brush arm that engage a brush, but Yoshida does not direct the person of ordinary skill in the art toward a second brush mounting element that has fins and brush contact portions that are located in a longitudinal direction of a first brush mounting element. As such, the prior art as a whole fails to disclose important features of the claimed combination.

Conclusion

The prior art does not teach and does not suggest the combination of features claimed. The prior art directs the person of ordinary skill in the art toward structures which are dissimilar to the claimed structure. Each of the references teach in a direction away from the combination claimed. The references do not render the claimed subject matter obvious. Accordingly, it is

requested that the rejection be reversed and that the claims be indicated to patentably define over the prior art.

ISSUE: Whether claims 15-17 are rejectable under 35 U.S.C. 103(a) as being unpatentable over JP '054 and Uchino et al., and further in view of Mabuchi.

CLAIMS 15-17

Claims 15-17 provide that the holder is composed of a material having a first modulus of elasticity and the brush arm is composed of another material having a second modulus of elasticity that is less than the first modulus of elasticity. The Office Action states that Column 3, lines 26-36 of Mabuchi teaches a similar construction where two different materials are used for the brush holder and one is more resilient than the other. Appellant respectfully disagrees as Mabuchi merely discloses making a brush arm that is composed of two different materials. However, there is neither a teaching nor any suggestion of making a brush arm and a holder from two different materials wherein one material has a higher modulus of elasticity than the other material. In fact, Mabuchi only discloses that the brush arm 1 can be made of a copper or brass strip for the terminal strip 9' and a highly resilient phosphor bronze or beryllium bronze strip for the commutator contactor strip 10, but there is no specific teaching that the copper strip has a modulus of elasticity that is less than the phosphor bronze or beryllium bronze. Mabuchi is completely silent as to the specific modulus of elasticity of the copper or brass strip. As such, the prior art as a whole fails to establish a prima facie case of obviousness as the

references as a whole do not direct the person of ordinary skill in the art toward the features of the present invention.

The prior art does not teach and does not suggest the combination of features claimed. The prior art directs the person of ordinary skill in the art toward structures which are dissimilar to the claimed structure. Each of the references teach in a direction away from the combination claimed. The references do not render the claimed subject matter obvious. Accordingly, it is requested that the rejection be reversed and that the claims be indicated to patentably define over the prior art.

Conclusion

Appellant respectfully requests that the decision rejecting the claims be reversed and be

set aside as the prior art as a whole fails to suggest each feature of the claimed combination. Absent teachings and suggestions in the prior art to direct the person of ordinary skill in the art toward the combination claimed, the rejection should be considered untenable and the claims should be considered patentable as presented.

Respectfully submitted
for Appellant,

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SHOULD ANY OTHER FEE BE REQUIRED, THE PATENT AND TRADEMARK OFFICE
IS HEREBY REQUESTED TO CHARGE SUCH FEE TO OUR DEPOSIT ACCOUNT 13-
0410.

(8) CLAIMS APPENDIX

1. A brush holder device for use in a small-size motor including a brush arm connected at one end to an input terminal for external electrical connection and supporting at an opposite end a brush, comprising:

a brush including an integrally formed engagement portion;

5 a brush arm having an engagement hole formed therein, the engagement hole assuming substantially the same shape as that of the engagement portion of said brush, and including brush arm brush contact portions located at laterally opposite edges of the engagement hole; and

10 a holder having an engagement hole formed therein and holder brush contact portions formed via bending, said holder being made of a material having lower spring properties than said brush arm, the engagement hole assuming substantially the same shape as that of the engagement portion of said brush, said holder being fixed to said brush arm such that the engagement hole of said holder is aligned with the engagement hole of said brush arm, said brush arm brush contact portions extending through said engagement hole of said holder, 15 whereby one of said brush arm brush contact portions is adjacent to one of said holder brush contact portions;

20 wherein said holder brush contact portions are formed on said holder along opposite edges defining said engagement hole of said holder, one edge of said holder being opposite another edge of said holder in a longitudinal direction of said brush arm, said engagement portion of said brush being press-fitted into the engagement holes of said holder and said brush

arm, whereby said engagement portion of said bush is fixed to said holder and said brush arm via said holder brush contact portions and said brush arm brush contact portions.

3. A brush holder device for use in a small-size motor according to claim 1, wherein said holder includes fins formed through bending along opposite ends thereof, the ends being opposite in a longitudinal direction of said brush arm.

4. A brush holder device, comprising:

a brush including an integrally formed engagement portion having a first side, a second side, a third side and a fourth side;

5 a brush arm having a defined engagement hole, said engagement hole having substantially the same shape as that of said engagement portion of said brush, said brush arm including a first brush contact portion located at one edge defining said engagement hole and a second brush contact portion located at another edge defining said engagement hole, said first brush contact portion being opposite said second brush contact portion, said first brush contact portion and said second brush contact portion extending in a longitudinal direction of said brush arm; and

10

a holder having a defined brush receiving hole, said brush receiving hole having substantially the same shape as that of the engagement portion of said brush, said holder including a third brush contact portion located at an edge defining said brush receiving hole and a fourth brush contact portion located at another edge defining said brush receiving hole, said

15 third brush contact portion being opposite said fourth brush contact portion in a longitudinal
direction of said brush arm, said holder being connected to said brush arm such that said
engagement hole aligns with said brush receiving hole and said first brush contact portion and
said second brush contact portion of said brush arm extends through said brush receiving hole,
said engagement portion of said brush extending through said engagement hole and said brush
20 receiving hole such that said first brush contact portion engages said first side of said brush, said
second brush contact surface engages said second side of said brush, said third brush contact
portion engages said third side of said brush and said fourth brush contact portion engages said
fourth side of said brush, whereby said brush is connected to said holder and said brush arm.

5. A brush holder device according to claim 4, wherein said holder includes fins formed
through bending along opposite ends thereof, the ends being opposite along a longitudinal
direction of said brush arm.

6. A brush holder device, comprising:

a brush including an integrally formed engagement portion;

a first brush mounting element having a defined engagement hole, said engagement hole
having substantially the same shape as that of said engagement portion of said brush, said first
5 brush mounting element including a first brush contact portion located at one edge defining said
engagement hole and a second brush contact portion located at another edge defining said
engagement hole, said first brush contact portion being opposite said second brush contact

portion; and

10 a second brush mounting element having a defined brush receiving hole, said brush receiving hole having substantially the same shape as that of the engagement portion of said brush, said second brush mounting element including a third brush contact portion located at an edge defining said brush receiving hole and a fourth brush contact portion located at another edge defining said brush receiving hole, said third brush contact portion being opposite said fourth brush contact portion, said third brush contact portion and said fourth brush contact portion defining a longitudinal length of said brush receiving hole of said second brush mounting element, said first brush contact portion and said second brush contact portion of said first brush mounting element having a length corresponding to said longitudinal length of said brush receiving hole of said second brush mounting element, said first brush mounting element being connected to said second brush mounting element such that said engagement hole is in alignment with said brush receiving hole, said first brush contact portion and said second brush contact portion extending through said brush receiving hole, said engagement portion of said brush extending through said engagement hole and said brush receiving hole such that said first, second, third and fourth brush contact portions are in direct contact with said engagement portion, whereby said brush is connected to said holder and said brush arm via said first, second, third and fourth brush contact portions.

7. A brush holder device according to claim 6, wherein said holder includes fins formed through bending along opposite ends thereof, the ends being opposite along a longitudinal

direction of said brush arm.

14. A brush holder device according to claim 4, wherein said first brush contact portion and said second brush contact portion of said brush arm have a length corresponding to a longitudinal length of said brush receiving hole of said holder.

15. A brush holder device according to claim 4, wherein said holder is composed of a material having a first modulus of elasticity, said brush arm being composed of another material having a second modulus of elasticity, said first modulus of elasticity being greater than said second modulus of elasticity.

16. A brush holder device according to claim 14, wherein said holder is composed of a material having a first modulus of elasticity, said brush arm being composed of another material having a second modulus of elasticity, said first modulus of elasticity being greater than said second modulus of elasticity.

17. A brush holder device according to claim 6, wherein said first brush mounting element is composed of a material having a first modulus of elasticity, said second brush mounting being composed of another material having a second modulus of elasticity, said second modulus of elasticity being greater than first modulus of elasticity.

18. A brush holder device according to claim 4, wherein said holder has a thickness that is greater than a thickness of said brush arm.

19. A brush holder device according to claim 6, wherein said second brush mounting element has a thickness that is greater than a thickness of said first brush mounting element.

(9) Evidence appendix

NONE

(10) Related proceedings appendix

NONE